



California Marine Petroleum Infrastructure

Public Workshop April 24, 2003
California Energy Commission

Agenda



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- Background
- San Francisco Bay Area
- Los Angeles Basin
- Future Infrastructure Demand
- Current trends
- Conclusions and Recommendations



Background



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- SFR Study identified problems related to marine infrastructure
 - Lack of well-connected tankage on the water
 - Lack of access to storage by independent importers
 - Uncertainty to be able to offload cargoes plays significant role in import decisions
- Infrastructure issues important in the light of increasing import dependency
- Findings were primarily based on market information and stakeholder meetings
- Separate study was launched to quantify the issues



Methodology



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- Meetings with industry stakeholders
 - Terminal and pipeline operators
 - Port Authorities
 - Selected refiners
- Quantitative Analysis
 - Database of State Land's Commission on vessel movements
 - US Army Corps of Engineers database
- Restraint identification
 - Hard restraints: dock dimensions, draft restrictions, pipeline capacity – often require major capital to resolve
 - Soft restraints: tank throughput (“turns”), berth occupancy – limits can be pushed but translate into additional operating costs
- Main report not public due to security and confidentiality concerns



California's Marine Petroleum Infrastructure



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- California Petroleum Infrastructure
 - 11 major refineries, 8 small refineries
 - 32 bulk storage terminals
 - 156 distribution terminals
 - 4259 end user storage facilities, including 34 military depots
 - Two major clean products pipeline systems (Kinder Morgan)
 - Extensive pipeline systems interconnect the local refineries
 - Crude oil production and pipeline systems
- Marine Infrastructure
 - All 11 major refineries, even when not directly on the water
 - 22 marine bulk storage terminals
 - 5 inland bulk storage terminals connected to docks
 - Many smaller facilities in secondary ports

Focus of study on main centers: SF Bay, LA Basin



Agenda



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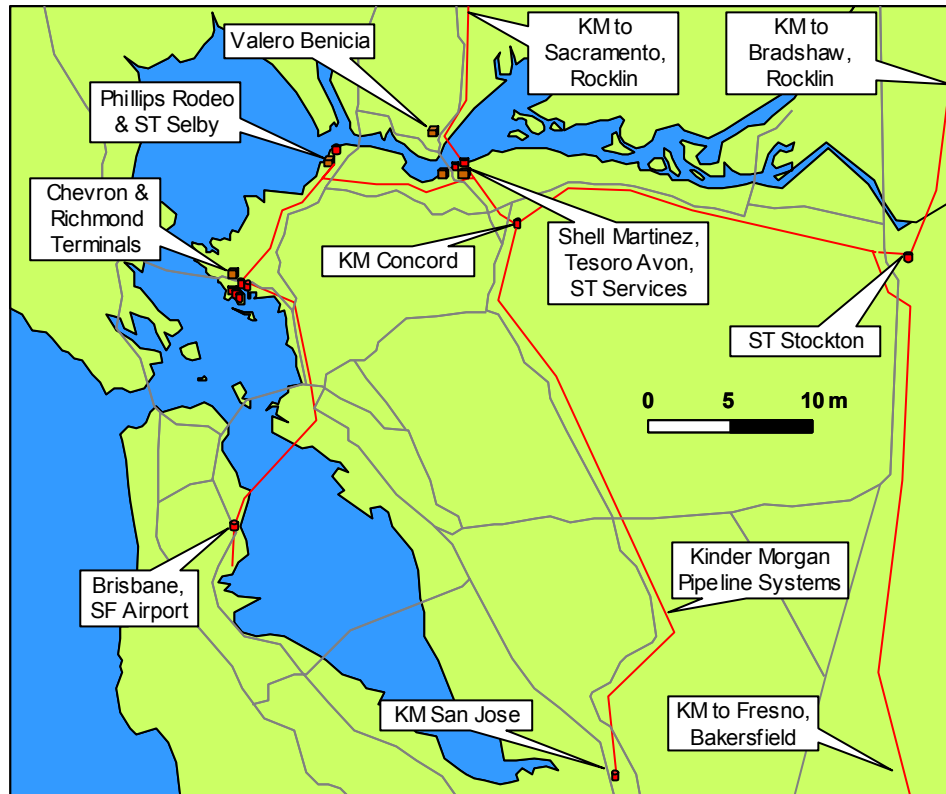
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SF Bay Area – General Overview



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- 5 Refineries
- 750 TBD crude, 57% waterborne
- Main channel draft 55 feet, restrictions apply to vessels over 45 feet draft
- Pinole shoals, entrance to San Pablo Bay currently less than maintenance draft of 39 feet
- Only emergency dredging was done in April 2001
- All refineries except Chevron affected by dredging problems
- Federal funding approved in February 2003 to dredge
- Problem is short season for disposal of sludge

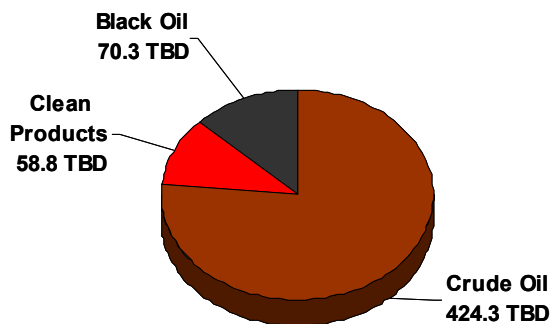
Draft restriction = smaller vessels, higher costs, berth congestion



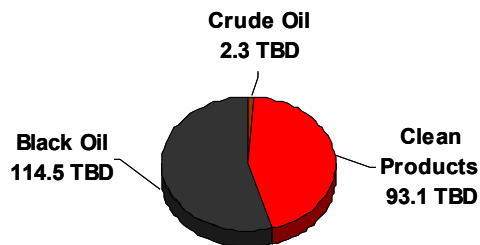
SF Bay Area – Waterborne Volumes



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2001 Receipts (Discharge)



2001 Shipments (Loading)

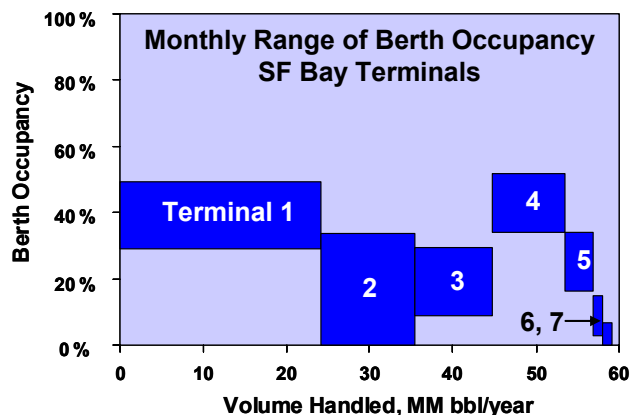
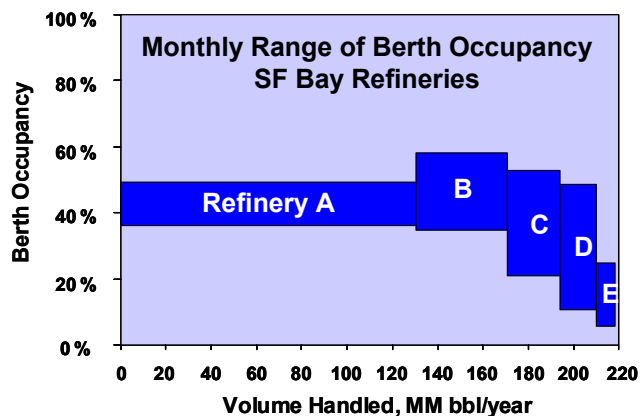
- Crude oil is over half of all petroleum product moved
- Clean products movements
 - In: blending components, jet fuel
 - Out: CARBOB to LA, non-CARB gasoline to Oregon
- Black Oil
 - Volumes exceed clean products
 - Same products moving in and out (residual fuels, cutter stock)
 - Volumes vary significantly month-by-month



SF Bay Area – Berth Occupancy



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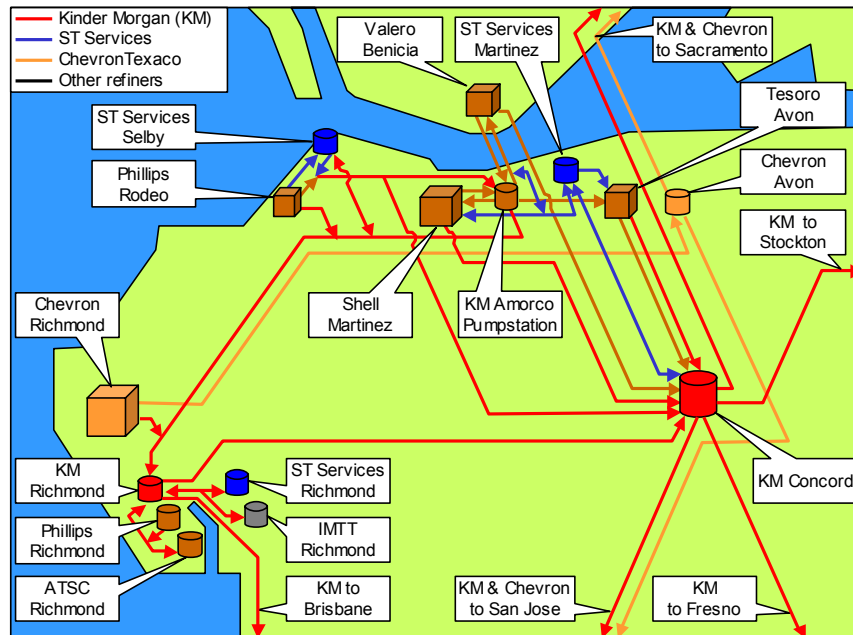
- General guidance
 - Less than 40%: underutilized
 - 40 to 60%: normal operating range
 - 60 to 80%: some scheduling conflicts and waiting times
 - More than 80%: queues form
- Over 85% of volumes is brought in over docks with occupancies in less than 50%
- 6 docks are underutilized
- One dock is utilized in peak months to an extent where scheduling problems and holding cost (demurrage) may occur



SF Bay – Clean Product Gathering System



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- Kinder Morgan's Concord terminal is start point for long distance pipelines
- Problem for most terminals and refiners is how to get products to Concord
- Capacity problems widespread
 - Line diameters too small
 - Pump and meter limitations
 - Suction problems
 - Scheduling conflicts
 - Product compatibility
- No easy solution, upgrades costly

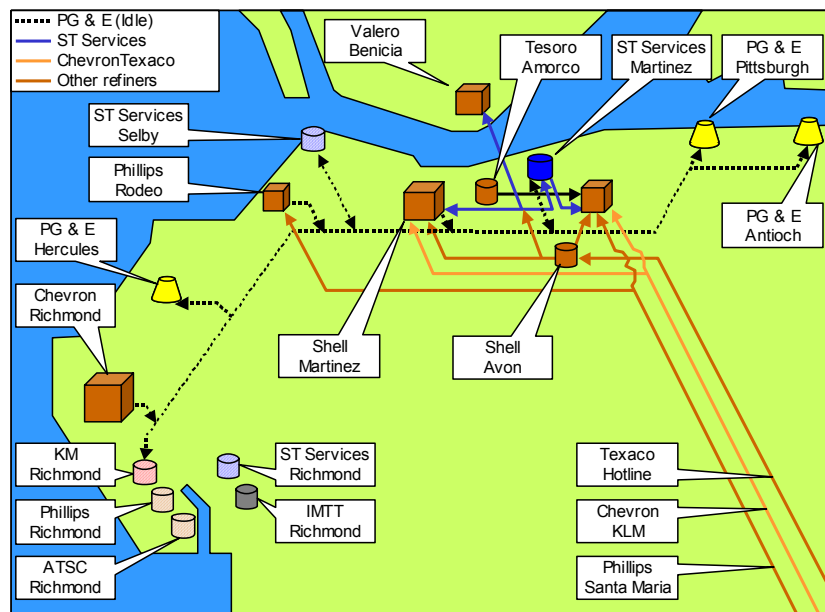
Things will have to get worse before they get better



SF Bay – Black Oil & Crude Oil Systems



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- No capacity problems reported
- Over 9 MM bbl of idle tankage still available at Mirant (ex PG&E) power plants in Pittsburg and Antioch
- Idle black oil pipeline system still connects to most refineries and terminals

Potential capacity for Crude Oil Reserve in idle tankage



SF Bay Area – Storage



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- All refiners and terminals are at the water
- Total tankage*
 - Refiners 41 MM bbl
 - Terminals 9 MM bbl
- At commercial terminals, throughputs average around 1 tank turn per month
- At refineries, operational tanks and crude oil storage are worked hard
- Not all refiners are equal
 - Two refineries have estimated average inventories of 6 – 7 days
 - Three have estimated average inventories of 10 – 12 days

*** Data from CA Water Board Permit Registry and State Lands Commission**



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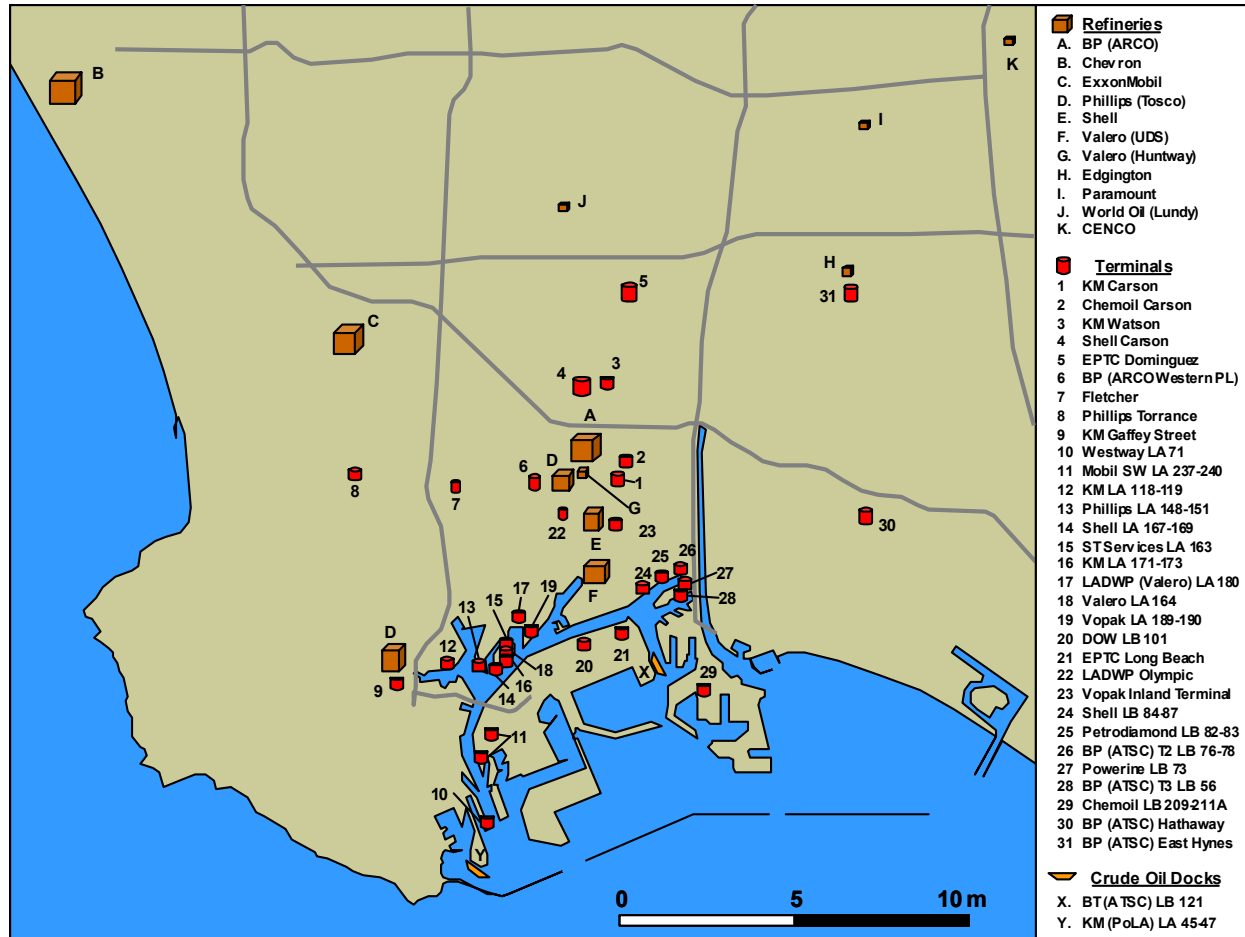
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LA Basin – General Layout



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- 6 Major refineries, 4 small refineries
- 1020 TBD crude, 51% waterborne
- One berth with 72 feet draft, capable of receiving VLCC
- Land is at a premium
- Most refineries, some terminals located some distance inland
- Two separate Ports, LA & LB
- Ports favor cars, containers over bulk liquids



LA Basin – Dock Access for Refineries



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Refinery	Crude Oil	Clean Products	Black Oil
BP	LB 121 direct*	LB 76 direct	LB 76 direct
	LB 121 to EPTC	LB 76 through T2	LB 84 via Shell, EPTC
	LB 76 direct		
	LB 84 via Shell, EPTC		
ChevronTexaco	Mooring	Mooring	LA 171 via KM LB 84 via EPTC, Shell
ExxonMobil	LB 84 via EPTC	LA 238 via SW Terminal LA 119 via KM	LA 238 via SW Term. LA 171 via KM
ConocoPhillips	LB 121 direct	LA 148 direct	LA 148 direct
	LB 121 to EPTC	LA 119 via KM	LA 171 via KM
	LB 76 direct	LA 167 via Shell	LA 167 via Shell
	LB 84 via Shell, EPTC		LB 84 via EPTC, Shell
Valero	LB 121 direct	LA 164 direct	LB 84 via Shell, EPTC
	LB 121 to EPTC	LA 119 via KM	
	LB 76 direct	LA 167 via Shell	
	LB 84 via Shell, EPTC	LB 84 via Shell	
Shell	LB 84 direct	LA 167 via Carson	LB 84 direct
	LB 84 via EPTC	LB 84 direct	LB 84 via EPTC
		LB 84 via terminal	LA 167 via Carson

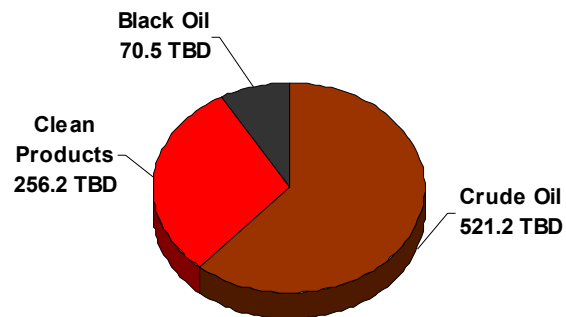
"Direct" means a transfer to or from the berth directly to refinery tankage without using quayside storage



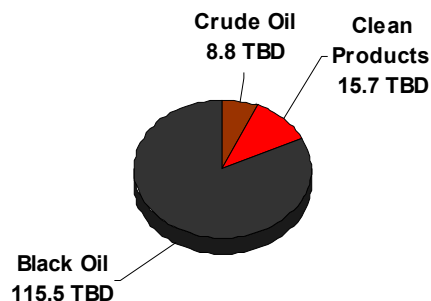
LA Basin – Waterborne Volumes



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2001 Receipts (Discharge)



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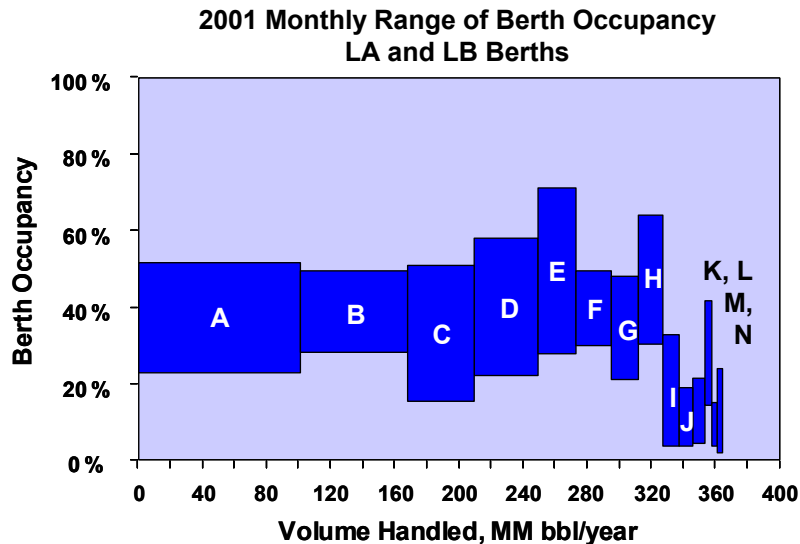
- Crude oil is over half of all petroleum product moved
- Significant clean product imports
 - In: blending components, jet fuel
 - Out: Low grade gasoline, petrochemical feedstocks
- Black Oil
 - Bunker market
 - Same products moving in and out (residual fuels, Light Cycle Oil)
 - Volumes vary significantly month-by-month



LA Basin – Berth Occupancy



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- General guidance
 - Less than 40%: underutilized
 - 40 to 60%: normal operating range
 - 60 to 80%: some scheduling conflicts and waiting times
 - More than 80%: queues form
- Almost all docks in busy months are at the high end of the normal operating range
- Few docks are underutilized
- Two terminals are operating at capacity



LA Basin – Storage



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- Total tankage*
 - Refiners 61 MM bbl
 - Terminals 28 MM bbl
 - Only 8 MM bbl directly at the water
- At commercial terminals, throughputs average around 1 tank turn per month
- At refineries, operational tanks and crude oil storage are worked very, very hard
- Average on site inventories of crude and products of refiners are between 4 and 12 days
- Estimated current use of terminal capacity (total black oil, crude, clean)
 - 11.4 MM bbl (41%) is owned by local refiners
 - 12.0 MM bbl (43%) is leased by local refiners under term agreements
 - 2.6 MM bbl (9%) is owned or leased by independents
 - 2.1 MM bbl (7%) idle
- SCAQMD Rule 1178 will cause up to 15% of gasoline tankage to be out of service at any point in time over next 6 years

*** Data from CA Water Board Permit Registry and State Lands Commission**

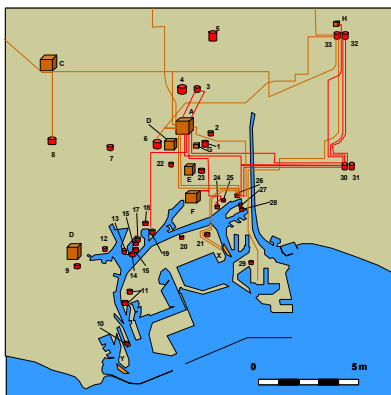


LA Basin – Gathering Pipeline Systems

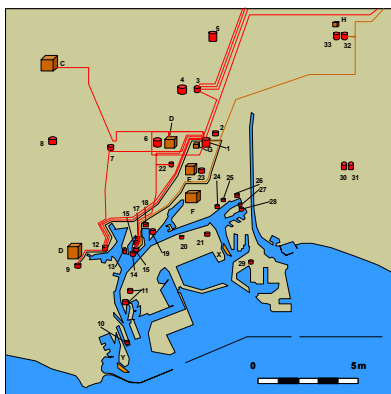


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Company A



Company B



- Pipeline systems
 - Most refiners and large terminal operators have proprietary pipeline systems
 - Some of these systems are of extraordinary complexity
 - Still, some terminals and refineries are not well connected
- Delivery point for most refiners into Kinder Morgan system is Watson
- Only 2 facilities can meet the flow rate requirement for direct transfer into the long distance system (15,000 bbl/hr)
- Some real bottlenecks are in transfers of docks to inland terminals



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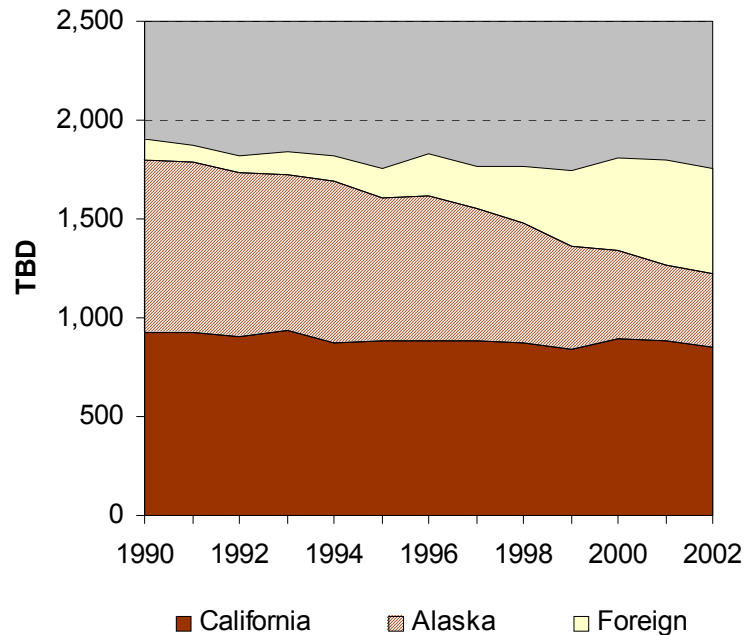


Future Infrastructure Demand – Crude Oil



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California Crude Oil Sources



- California production
 - Mature fields
 - Holding up well with enhanced recovery techniques
 - Expected to continue to decline
- Alaska decline 8% per year
- Foreign imports
 - Make up shortfall, now exceed ANS
 - Half of foreign imports is from Middle East, arrives in VLCCs

VLCC supplies likely to reach 40% of total waterborne by 2010



Crude Oil – Impact of Increased VLCC Supplies



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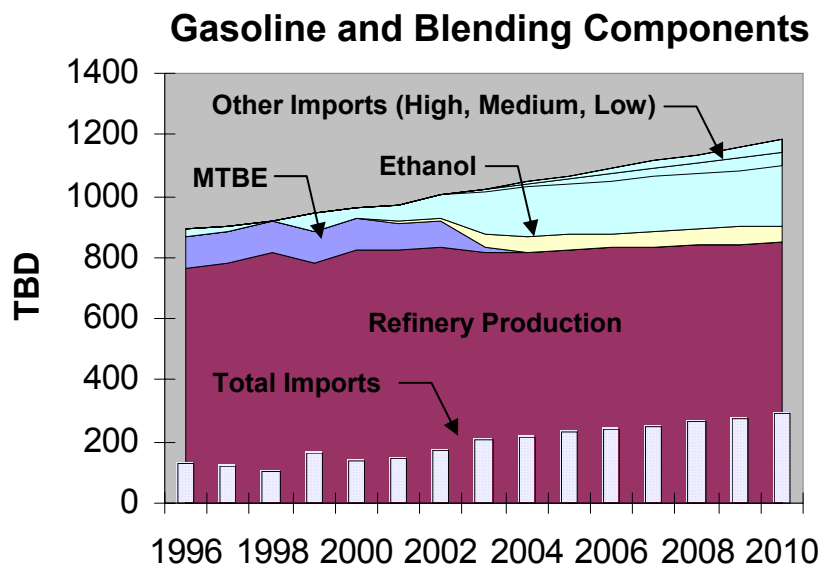
- Current Operations
 - Around 1 VLCC/week, equivalent of 250 TBD, 25% of waterborne crude
 - BP's berth 121 in Long Beach is only berth capable of handling a VLCC, serving BP, ConocoPhillips and Valero's LA refineries
 - VLCCs are lightered (cargo transferred to smaller tankers while at anchor offshore) for Chevron
- Long term infrastructure need for 2 VLCCs/week
 - Berth 123 with 3 MM bbl of storage at the water
 - Tie-ins to Chevron El Segundo, Mobil Torrance
 - Increased VLCC receipts in LA could leave more smaller cargoes for Bay Area
 - Discharge at berth instead of lightering and mooring reduces risk of spills



Future Infrastructure Demand - Gasoline



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➤ Scenario

- Refinery production increase 0.6% per year + known projects
- Demand increase base case 1.6% per year, low 1.1%, high 2.1%
- Current growth is 2 to 3% per year
- Half of ethanol by rail

➤ Results

- Imports increase by 100 TBD by 2010
- Almost all of increase in LA Basin
- At one tank turn per month would require 3 MM bbl
- One additional ship every 2.5 days
- Equivalent to one berth fully occupied

LA Basin Clean Products infrastructure faces major challenge



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Storage Capacity Additions



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Capacity	Product*	Location	By	For	Status	Complete
300,000	Clean	SF Bay	Terminal Co	Trading Co	Under existing permit	2003
200,000	Clean	LA	Terminal Co	Refiner	Under existing permit	2003
50,000	Clean	LA	Trading Co	Self	Permit June 2003	2003
600,000	Clean	LA	Refiner	Various	Upgrade of older tankage	2003
240,000	Clean	LA	Refiner	Self	Upgrade of older tankage	2004
500,000	TBD	LA	Small Refiner	Various	Upgrade of older tankage	2004 (?)
TBD	Clean	LA	Terminal Co	Trading Co	New construction	2007 (?)
2,000,000	Crude	LA	Terminal Co	Various	New construction	2007 (?)
TBD	Clean	LA	Terminal Co	Various	New construction	2008 (?)

* Clean products include gasoline, blending components, ethanol, jet, diesel

1.4 MM bbl in firm additions + up to 4 MM bbl potential



Recent Trends



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- Industry has responded to opportunities
- Changes from earlier reported positions
 - Refiner's terminal has reactivated idled tankage
 - Trading Companies signing term contracts for new capacity
 - Master Limited Partnerships willing to build new capacity on short to medium term contracts
- Caveat
 - All current projects under existing permits
 - New permitting expected to take 2 to 3 years
 - Port policies in LA may continue to lead to closure of terminals
- Commercial terminal operators are also studying debottlenecks of local docks and pipelines to get products into new tankage from the water



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Conclusions



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- SF Bay
 - Overall handling capacity adequate
 - Concerns
 - Lack of dredging funds, shoaling of East Bay
 - Widespread constraints in gathering pipeline system
- LA Basin
 - Overall handling capacity marginal
 - Concerns
 - General tightness of clean product storage
 - Limited access to tankage by independent importers
 - Lack of tankage on the water and constraints for docks without tankage to move product inland
 - Jetty capacity reaching upper end of normal operating range
 - Port policies aiming to remove tankage from the waterfront



Conclusions (Continued)



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➤ General Concerns

– Crude Oil

- Growing import dependency
- Lack of facilities capable of receiving Very Large Crude Carriers
- Higher risk associated with offshore crude oil transfers (“lightering”)
- Higher risk of spills at Multi-point Moorings
- General lack of storage and low operational inventories
- Uncertainty for additional tankage associated with new deepwater crude oil berth in the Port of Long Beach

– Permitting Environment

– Impact of SCAQMD Rule 1178

➤ Positives

- New capacity additions under existing permits
- Industry’s capability to do more with less



Recommendations



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- Active role for State to support infrastructure projects
 - One stop shopping permitting
 - Coordinate State and local interest in Ports of LA, LB and the Bay
 - Help resolve dredging issues in the Bay (funding, disposal, timing)
 - Support crude oil infrastructure projects to reduce exposure to the State's energy security in case of major spill
- Consider support, i.e., loan guarantees as proposed by SFR study, to facilitate private industry projects
- Collect and analyze data pertaining to waterborne movements of petroleum product on a regular basis

